

Curriculum Vitae

Valentin Féray

Assistant professor, University of Zurich

PERSONAL INFORMATION

ID: Valentin Féray, French, born September, 1984, married, 2 children.

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• EDUCATION

2006 – 2009 PhD at Université Paris-Est Marne-La-Vallée:

Advisor Philippe Biane, senior CNRS researcher;

Title Functions on the set of Young diagrams: characters of symmetric groups and Kerov polynomials.

2003 – 2007 Student at *École Normale Supérieure de la rue d'Ulm* (ranked 2nd at the entrance national competition).

2001 – 2003 Undergraduate studies in *Classes Préparatoires* at *Lycée Louis-Le-Grand (Paris)*.

• EMPLOYMENT HISTORY

2013 – ... Assistant professor for pure Mathematics at the University of Zurich (Switzerland).

2009 – ... CNRS junior researcher at LaBRI, Université de Bordeaux (France). On leave from August 2013.

2007 – 2009 PhD fellow and teaching assistant at University Paris-Est Marne-La-Vallée.

• PRIZES AND AWARDS

1. 2013: I was invited to give a series of lectures in *Collège de France* by the "Peccot Foundation": this prestigious opportunity is given to one or two French mathematician(s) (or mathematician(s) working in France) under 30 each year.

2. 2010-2013: *Prime d'Excellence Scientifique* awarded by CNRS.

3. Best student paper award at FPSAC 20 international conference.

• GRANTS

2017 – 2019 Principal investigator of the SNSF (Swiss National Science Foundation) grant "Shifted symmetric functions". Approved amount: 309 kCHF (290 k€). Grant nb: 200020_172515.

2017 I was one of the four main organizers of a thematic trimester at *Institut Henri Poincaré*, Paris. Total budget: >250 k€.

2014 – 2017 Principal investigator of the SNSF (Swiss National Science Foundation) grant "Dual combinatorics of Jack polynomials". Approved amount: 242 kCHF (232 k€). Grant nb: SNF-149461.

• SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL STUDENTS

- 2017 – ... Cosupervision with Mathilde Bouvel of a PhD student, Jacopo Borga.
2016 – ... Supervision of a PhD student, Raúl Penaguião.
2014 – 2017 Supervision of a PhD student, Dario De Stavola.
2013 – 2017 Cosupervision with Paul-Olivier Dehaye of a PhD student, Helen Riedtmann.
2011 – 2014 Cosupervision with Jean Christophe Aval of a PhD student, Omar Tout (graduated in Nov. 24th, 2014).

2014 – ... Supervision of four postdoctoral students, Per Alexandersson (1 year, 2014), Jehanne Dousse (3 years, 2015-2018), Marko Thiel (3 years, 2015-2018) and Benedikt Stufler (2 years, 2017-2019).

• TEACHING ACTIVITIES

- 2013 – ... Teaching as professor at University in Zurich (courses: representation theory, enumerative combinatorics, random combinatorial structures, complex analysis, student seminar on permutations, analytic combinatorics, introduction to Ising model, martingales and Markov chains).

2007 – 2009 Teaching assistant during my PhD (courses: Analysis I, Algebra I, Programming in C I and II).

• OUTREACH ACTIVITIES

- 2019 Supervising a "Maturaarbeit" on the Probabilistic Method of a high school student from the Junior Euler Society.

Aug. 2012,
2014, 2016 Participation to "Mat'les Vacances", a math "summer camp" to convince underprivileged high school students that they can also do long studies in mathematics or other scientific areas.
Participation to the associated book *Maths la Terminale, Ed. Ellipse., 2016*

Nov. 2013 Talk for first year university students at « Mathematical Park » in Institut Henri Poincaré, Paris.

May 2009 &
May 2010 I organized and animated a stand for CNRS at "salon de la culture et des jeux mathématiques" (mathematical culture and games show).

• SCIENTIFIC COMMUNITY WORK

- 2020 Program committee member for FPSAC conference.
2017 – ... Reviewer for UK, German, Polish and Islandic grant agencies (EPSRC, DFG, NCN, IRF).

2008 – ... Referees of more than 50 papers for various journals (Ann. Math., JEMS, J. Alg., Asterisque, JCTA, J. Alg. Comb., J.Comb. Alg., IMRN, Pacific J. Math., J. Math. Soc. Japan, Math. Zeitschrift, SIAM J. Disc. Math., Ann. IHP (B), Ann. Comb., SLC, Method. Comp. Appl. Prob., Adv. Appl. Math., MPRF, PTRF, RSA, Stat. Prob. Letters, Elec. J. Comb., CPC, ALEA, Ann. Appl. Prob., SIGMA) and for FPSAC and AofA conferences.

2010 – 2013 I have been a member of four hiring committees for permanent junior teacher-researcher positions (Marne-La-Vallée 2010-2012-2013, Caen 2012).

2011 – 2013 Deputy head of the *Combinatorics and Algorithms* research team in LaBRI.

- ORGANIZATION OF SCIENTIFIC MEETINGS

- June 2019 Co-organizer of Conference on "Permutation Patterns" at the University of Zurich (expected: ~ 80 participants).
- Jan–Mar 2017 Co-organizer of the thematic quarter "Combinatorics and Interactions" at Institut Henri Poincaré, Paris (~ 200 participants).
- 2014 – ... Organizer of a Discrete Math Seminar every second week at the University of Zurich.
- Mar. 2013 Co-organizer of the annual week-long meeting of the ALÉA French research group in CIRM, Marseille (~ 100 participants).

- SELECTED JOURNAL PUBLICATIONS

The complete list can be found on my web page.

1. *The geometry of random minimal factorizations of a long cycle via biconditioned bitype random trees*, with Igor Kortchemski.
Annales Henri Lebesgue, **1**, pp. 149–226, 2018.
2. *Universal limits of substitution-closed permutation classes*, with Frédérique Bassino, Mathilde Bouvel, Lucas Gerin, Mickaël Maazoun and Adeline Pierrot.
Journal of European Mathematical Society, to appear.
3. *The Brownian limit of separable permutations*, with Frédérique Bassino, Mathilde Bouvel, Lucas Gerin and Adeline Pierrot.
Annals of Probability, **46** (4), pp. 2134–2189, 2018.
4. *Shifted symmetric functions and multirectangular coordinates of Young diagrams*, with Per Alexandersson.
Journal of Algebra, **483**, pp. 262–305, 2017.
5. *Cumulants of Jack symmetric functions and b-conjecture*, with Maciej Dołęga.
Transactions of the AMS, **369** (12), pp. 9014–9039, 2017
6. *Gaussian fluctuations of Young diagrams and structure constants of Jack characters*, with Maciej Dołęga.
Duke Mathematical Journal, **165** (7), pp. 1193–1282, 2016.
7. *A simple model of trees for unicellular maps*, with Guillaume Chapuy and Éric Fusy.
Journal of Combinatorial Theory Series A, **120**, pp. 2064–2092, 2013.
8. *Asymptotics of q -Plancherel measures*, with Pierre-Loïc Méliot.
Probability Theory and Related Fields, **152** (3–4), pp. 589–624, 2012.
9. *Asymptotics of characters of symmetric groups related to Stanley character formula*, with Piotr Śniady.
Annals of Mathematics, **173** (2), pp. 887–906, 2011.
10. *Explicit combinatorial interpretation of Kerov character polynomials as numbers of permutation factorizations*, with Maciej Dołęga and Piotr Śniady.
Advances in Mathematics, **225** (1), pp. 81–120, 2010.

- SELECTED INVITATIONS

1. Lecturer of minicourses in international summer schools or workshop:
 - *Summer School in Algebraic Combinatorics*, Kraków (Poland), July 2020;
 - *Séminaire Lotharingien de Combinatoire*, Bertinoro (Italy), September 2017;

- *Summer School on probability and mathematical physics*, Lago Maggiore (Italy), September 2017;
 - Workshop on "*Cumulants, concentration and superconcentration*", Osnabrück (Germany), December 2016;
 - Workshop *Probability and representation theory in Edinburgh*, February 2014;
 - *Cours Peccot* in Collège de France, Paris, January/February 2013.
2. Invited speaker at major international conferences:
 - AofA (*Analysis of Algorithms*) Conference, Marseille (France), June 2019;
 - FPSAC (*Formal Power Series and Algebraic Combinatorics*), South Korea, July 2015;
 - SPA (*Stochastic Processes and Application*), Invited Session Speaker, 2010 and 2017.
 3. Participation to invitation-only workshops in prestigious conference centers:
 - Dagstuhl seminar on "Logic and Random Discrete Structures", November 2020;
 - Banff workshop on "Asymptotic algebraic combinatorics", March 2019.
 - Oberwolfach workshops on "Enumerative Combinatorics", May 2018 and March 2014;
 - Erwin Schrödinger Institute (Vienna) workshop on "Bialgebras in free probability", 2011.
 4. Colloquium, University of Fribourg (Switzerland), December 2017.

• MAJOR RESEARCH ACHIEVEMENTS

1. A combinatorial framework for the dual approach to symmetric group representations developed in the '90s by the Russian school (Vershik, Kerov, Olshanski, Okounkov, ...). This includes in particular the proofs of two positivity conjectures, due respectively to Kerov and Stanley, and an application to asymptotics of characters.

This work led to the best student paper award at FPSAC 2008, and to publications, among others, in Advances in Mathematics and Annals of Mathematics. This collection of results has also been the subject of a presentation at Séminaire Bourbaki (P. Cartier. Exp. No. 1071:373–396, 2013) and, more recently, of a book chapter (Chapter 10 of Representation Theory of Symmetric Groups, P.-L. Méliot, CRC Press, 2017).

2. The description of the fluctuations of linear statistics for deformations of the Plancherel measures related to Hecke algebras and Jack polynomials.

These results were published in Probability theory and Related Fields and Duke Mathematical Journal, respectively.

3. The theory of mod- φ convergence to obtain precise probabilistic estimate from a good control of the characteristic function (or of cumulants). This applies to problems in random combinatorial structures, in classical probability theory, in statistical physics, ...

This work led to the publication of the already largely cited research monograph "Mod φ convergence: Normality zones and precise deviations". I was also invited to do two mini-courses on the topic.

4. The theory of weighted dependency graphs to prove central limit theorems for statistics in various combinatorial structures.

5. The discovery of a universal Brownian limit object for permutation classes.

This work led to publications in Annals of Probability and Journal of the European Mathematical Society; the first paper has also been the subject of two master theses, by students of Miermont and Le Gall.